SYSTEM SAFETY PROGRAM PLAN

FOR THE

POLAR OPERATIONAL ENVIRONMENTAL SATELLITE PROGRAM (POES)

OCTOBER 2002

Goddard Space Flight Center
Code 480

POES System Safety Program Plan

Signature on file

Approved By: _____

Program Manager

Signature on file

Approved By: _____

Systems Assurance Manager

Signature on file

Approved By: _____

Program Safety Manager

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POES System Safety Program Plan

1.0 Introduction

This plan establishes the safety organizational relationships, responsibilities, management and engineering requirements to assure a comprehensive hazard assessment for the entire life cycle of the POES spacecraft. Safety management and engineering will be integrated with the overall POES Program activities involving system design, instrument receiving and shipping, integration, test, transportation, launch activities, all POES spacecraft, the launch vehicle, ground support equipment, facilities and property, other spacecraft, and the environment.

1.1 Purpose

The purpose of the POES SSPP is to provide a description of the tasks and activities of safety management and safety engineering required to identify, evaluate, and eliminate or control hazards throughout the POES spacecraft lifecycle. The POES Program personnel at GSFC will develop contractual Performance Assurance Requirements (PAR). The PAR will be flowed down to the spacecraft contractor, and the primary instrument subcontractors, and will provide the basis of understanding between GSFC and all contractors as to how the safety effort will be accomplished to meet the technical and operational safety requirements for the POES Program. The ultimate purpose of this SSPP is to:

- Identify program systems safety requirements and define responsibility for implementing these requirements.
- Focus management and engineering attention to the safety and hazard control aspects of the system.
- Ensure a disciplined approach to methodically control safety aspects, identify hazards, and prescribe and implement timely and effective corrective action.
- Ensure that the safety program is fully integrated with the design, engineering fabrication and test processes, and launch activities.
- Ensure that the effectiveness of the program is under continuous surveillance and evaluation.

1.2 Scope

This System Safety Program Plan outlines the detailed requirements and methods of implementation of a comprehensive system safety program as outlined in MIL-STD 882C. When the POES program document GSFC S-480-26.1 was signed, MIL-STD-1574A, 15 August 1979 was the current version of the system safety military standard. MIL-STD-882C supercedes this version, and will take precedence in the event of design engineering changes. In the event of design engineering changes, the requirements of the most recent revision of EWR 127-1 will also take precedence over WSMCR 127-1. This program will ensure that proper emphasis is placed on meeting system safety objectives, ensure compliance with safety requirements, and enforce controls to identify, eliminate, and/or control hazards, and to minimize their impact on personnel and equipment. This plan encompasses the systems safety and industrial safety functions to be performed by all program participants including other government agencies and contractors.

1.3 Policy

POES program management is committed to meeting all OSHA, NASA, and Range Safety requirements to assure the highest practical level of safety.

1.4 Objectives

The objectives of this safety plan are:

- Completely and comprehensively document goals and criteria for the safety of personnel and the prevention of damage to the POES instruments, POES spacecraft, launch vehicle, ground support equipment, facilities and property, other spacecraft, and the environment are established, implemented, and reviewed throughout the life cycle of the POES spacecraft system.
- To oversee and assure implementation of those safety and hazard control tasks necessary to ensure full consideration of the safety goals and requirements throughout all phases of the program.
- Assure hazards are identified as early as possible in the design phase of the POES Program.
- Assure appropriate actions are taken in a timely manner to eliminate or reduce the safety risks associated with the identified hazards, reducing them to an acceptable level.
- To report, document, and investigate all mishaps and to develop and implement corrective action plans and lessons learned in accordance with NASA requirements.

1.5 Program Safety Plan Updates

The SSPP will be updated whenever necessary to reflect any changes to the POES Safety Program. SSPP updates will follow the same approval protocol as the original document.

1.6 Tailoring of Range Requirements

The POES Program and the spacecraft contractor will collaborate with the Western Range to tailor range requirements and ensure the specific needs of the mission are met with regards to designs and hazards.

1.7 POES System Overview

The NOAA-KLMN and N' satellite is a 3-axis stabilized satellite oriented with the optical instruments maintained continuously earth pointing. The solar array counter-rotates about the pitch axis at one revolution per orbit to provide single-axis sun orientation over the specified mission-orbit sun angle range of 0 to 80 degrees. The satellite comprises four major assemblies: the Instrument Mounting Platform (IMP), the Equipment Support Module (ESM), the Reaction Control Support Structure (RSS), and the Solar Array (SA) assembly.

The IMP is the precision instrument mounting surface and houses those instruments which have the more stringent pointing requirements and/or which need an uninterrupted view of space for detector cooling purposes. These instruments are the Advanced Very High Resolution

Radiometer-Mod3 (AVHRR/3), and the High Resolution Infrared Radiation Sounder-Mod3 (HIRS/3). The IMP also supports the primary attitude-sensing equipment: namely, an earth horizon sensor, an Inertial Measuring Unit (IMU), and a Sun Sensor Assembly (SSA). The rear surface of the IMP is the primary thermal control surface for the instruments. It houses an array of thermal control louvers, protected from solar illumination in mission orbit by a sunshade.

The second major assembly, the ESM, contains the majority of the satellite electronic support equipment. It is pentagonal in section, but unsymmetric to provide a large earth-viewing face upon which lower pointing-accuracy instruments (SBUV/2, AMSU, SEM/2, SAR, and DCS-2 antennas) are mounted. The ESM houses most of the components comprising the Data Handling, Attitude and Control, Communications, and Command and Control Subsystems as well as elements of the instrument complement which do not require external viewing. One segment of the mounting area, at the lower end of the module, is primarily dedicated to SAR equipment.

The principal function of the RSS is to accommodate the satellite propulsion equipment. The NOAA-KLM Propulsion System, like that on NOAA-HIJ, is a hybrid solid/liquid/cold-gas system. The solid rocket motor, a STAR-37XFP which is mounted within the RSS, provides the bulk of the change in velocity capability for orbit (apogee) injection. This motor is also referred to as the Apogee Kick Motor (AKM).

Changes have been made for the NOAA N and N' Propulsion System to accommodate the Delta II launch vehicle. The change from the Titan II to the Delta II removed the requirement for the AKM. Also, NOAA N and N' will not have a Hydrazine Propulsion System. The resultant system for N and N' is a simple, high pressure GN2 blowdown system with a minimum number of components, maximum use of heritage components, optimized to provide fault tolerance, and provides for full functional redundancy. Pressure regulated hydrazine tanks, thrusters, manifolds, and associated hardware have been eliminated.

The NOAA N and N' Propulsion Subsystem design results in varying thrust levels, including 2.0 lbf at the beginning of the mission to 0.2 lbf at end of life. The Nitrogen Unloading System (NULS) can compensate for lower thrust levels during blowdown through an increased number of pulses. There will be no impact to flight software.

The solar array is a single-axis sun-tracking array consisting of ten hinged honeycomb panels with a total area of 181 Square feet. The overall spacecraft weight is approximately 4920 pounds at liftoff, which includes the hydrazine, gaseous nitrogen, and AKM expendables. NOAA KLM spacecraft are launched from the Western Range at Vandenberg Air Force Base (VAFB), California, by the Titan II space launch vehicle (SLV). NOAA N and N' will be launched on the Delta II SLV from VAFB. The Titan II SLV consists of a Titan II intercontinental ballistic missile that has been converted to a SLV configuration through the extensive use of technology and hardware developed during the Titan III and IV programs. It is capable of placing 5000 pounds (2268 kg) into a polar low-Earth orbit. Below is a listing of the POES satellite subsystems:

- Attitude Determination and Control Subsystem (ADACS)
- Reaction Control Subsystem (RCS) including Propulsion Subsystem (PS)

- Data Handling Subsystem (DHS)
- Communications Subsystem
- Command & Control Subsystem (C&CS)
- Flight Software
- Power Subsystem
- Thermal Control Subsystem (TCS)
- Structure (STS)

2.0 Applicable Documents and Standards

EWR 127-1	Eastern/Western Range Safety Regulations
WSMCR 127-1	Western Space and Missile Center Safety Requirements, Range Safety Regulation, 15 May 1985
MIL-STD-1574A	System Safety Program for Space and Missile Systems, 15 August 1979
MIL-STD-882C	Military Standard System Safety Program Requirements, 19 January 1993
MIL-STD-882D	Department of Defense Standard Practice for System Safety, 10 February 2000
29 CFR 1910	Code of Federal Regulations, General Industry
NAS5-30350 Attachment 1, Section 9	Statement of Work for the NOAA-K,L,M,N, and N-prime Satellites
GSFC S-480-26.1	Performance Assurance Requirements for the NOAA-K,L,M,N, and N-prime Satellites
NAS5-30350 Attachment 2, Part C	Contract Data Requirements List (CDRL)
NPD 8621.1	NASA Procedures and Guidelines for Mishap Reporting, Investigating, and Recordkeeping
NPD 8621.1G	NASA Mishap Reporting and Investigating Policy
NPD 8710.3	NASA Policy for Limiting Orbital Debris Generation
NSS 1740.14	Guidelines and Assessment Procedures for Limiting Orbital Debris
300-PG-7120.2.2	Mission Assurance Guidelines (MAG) for Tailoring to the Needs of GSFC Projects
300-PG-7120.2.1	System Safety Support to GSFC Missions and Other Organizations

NPG 7120.5	Program and Project Management Processes and Requirements
NPD 8700.1	NASA Policy for Safety and Mission Success

3.0 Safety Program Management

The following describes the safety organizational relationships within and external to the POES Program. Figure 3-1 is the POES Program Organizational Chart.

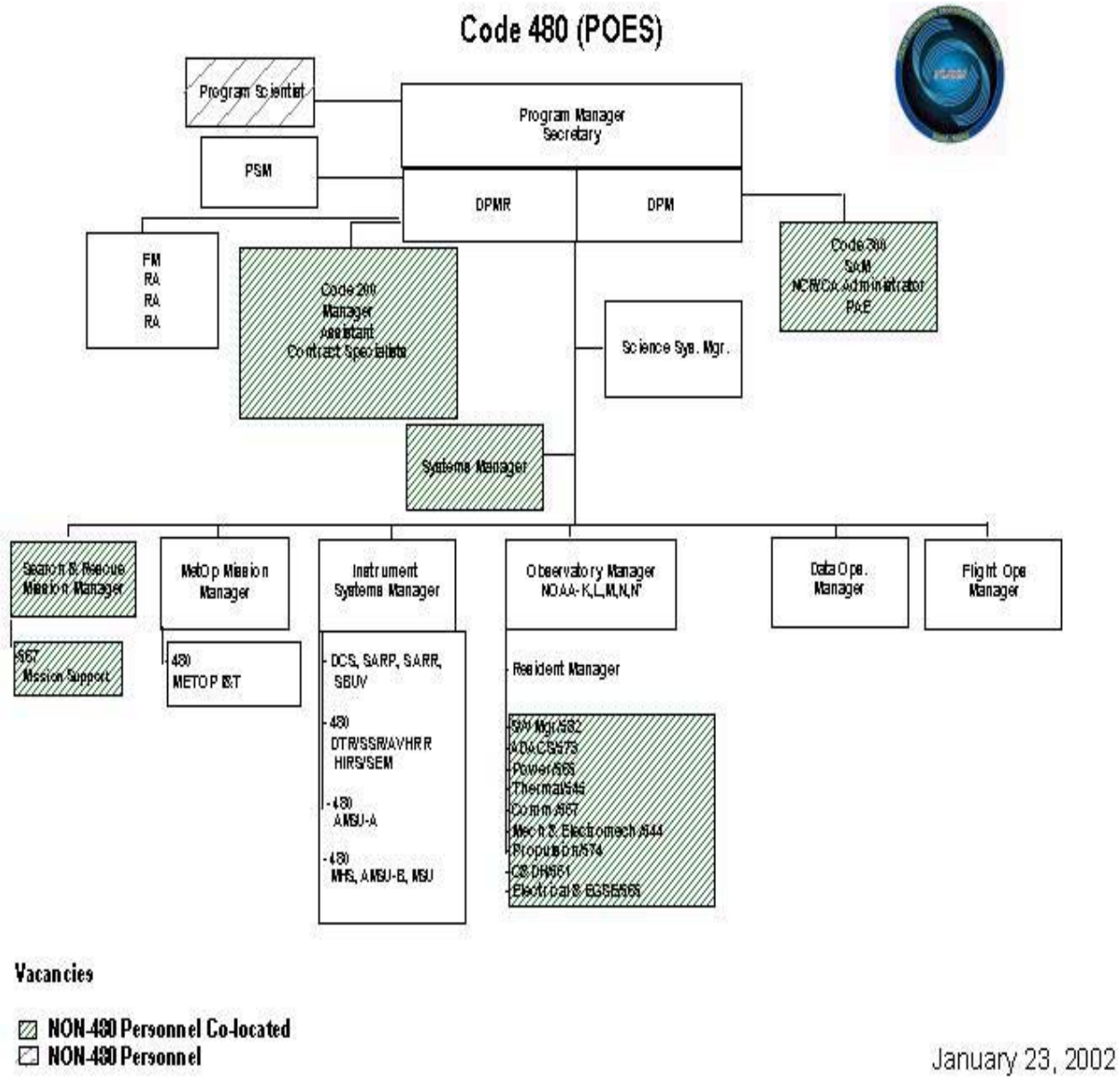

Figure 3-1. POES Program Organization

3.1 Responsibilities

Successful implementation of this SSPP is the responsibility of everyone associated with the POES Program. The Plan provides details relating to safety accountability and safety responsibilities associated with the POES Program. The program system safety activity is an integral part of the POES Program management, and as such, is the responsibility of the POES Program Manager.

To ensure complete system safety, and that the safety program tasks are implemented in a timely manner, the POES Program Manager has delegated overall oversight for program system safety to the Program Safety Manager, through the POES Systems Assurance Manager. This includes oversight for the performance, monitoring, and coordination of the POES Program safety tasks and requirements.

3.1.1 POES Program Manager

The Program Manager shall:

- Ensure that an effective health and safety program is implemented within all project areas of operation, and to ensure that all mishaps are properly reported and dispositioned (NAS5-30350, Attachment 2, Part C; NPD 8621.1; NPD 8621.1G).
- Ensure compliance with the SSPP for the POES project.
- Assign overall systems safety oversight to the Program Safety Manager through the Systems Assurance Manager.
- Provide signature for the Letter of Safety Compliance on the POES Program.
- Sign off on all GSFC and contractor safety documents.

3.1.2 Program Systems Assurance Manager

The Program Systems Assurance Manager shall:

- Coordinate required safety efforts with the program and the program Safety Manager throughout the program's areas of operation to ensure that all safety tasks are completed, issues tracked and resolved, and that the program provides sufficient resources for the Program Safety Manager to implement an effective safety program.
- Monitor/audit contractor's safety programs to ascertain conformance with contractual requirements.
- Report to the Program Manager on the status of the safety program.

3.1.3 Program Safety Manager

The Program Safety Manager shall:

- Ensure that the safety program tasks are implemented in an effective and timely manner.
- Maintain cognizance over the safety critical events and conditions during all phases of the program's life cycle.

- Review and comment on specifications, requirements, test plans, safety data packages (MSPSP, ARAR), and proposed engineering changes on safety critical items.
- Report to the Systems Assurance Manager on the status of the safety program.
- Provide signature for Letter of Safety Compliance.
- Ensure that all mishaps are properly documented, reported, and dispositioned (NPD 8621.1; NPD 8621.1G).

3.1.4 Contracting Officer Technical Representative/Instrument and Subsystem Engineers (GSFC)

Contracting Officer Technical Representatives, Instrument and Subsystem Engineers, within their respective areas of operation, shall be responsible for:

- Implementing the requirements of the SSPP, within the framework of the PAR and other applicable contract documents, through interface with contractors and all other participants associated with the POES program.
- Identifying hazardous operations, unsafe practices, and conditions associated with flight hardware, ground equipment and facilities from the design phase through pre-launch and launch activities.
- Collaborating with the Systems Assurance Manager and the Program Safety Manager in all matters pertaining to system safety including accident reporting and corrective actions related to unsafe practices and conditions to ensure accomplishment of safety program objectives.
- Ensure that POES contractors comply with contract requirements to report, document, investigate and disposition mishaps.

3.1.5 Spacecraft Prime Contractor Responsibility

The spacecraft prime contractor shall, within the framework of the PAR and other applicable contract documents:

- Assign system safety responsibilities within the organization.
- Develop, conduct, and document detailed preliminary hazard analyses, and provide the resulting conclusions and recommendations.
- Implement system safety as required by contract, PAR and CDRL.
- Develop and promote system safety consciousness and participation within the organization.
- Report, document, investigate and disposition mishaps in accordance with NASA requirements (NPD 8621.1; NPD 8621.1G).
- Collaborate with the GSFC Systems Assurance Manager and the Program Safety Manager in achieving the objectives of this plan.
- The contractor shall submit to the POES Program a safety data package (SDP) that applies to the existent phase of the program at the time of the CDR, and a final SDP at FRR. The contents of each package shall show status of compliance with the applicable range safety requirements, and shall be submitted in accordance with Attachment 2 of the contract (NAS5-30350).
- Flow down all appropriate requirements to the subcontractors.

3.1.6 Instrument Prime Contractor Responsibility

The instrument prime contractors shall, within the framework of the PAR and other applicable contract documents:

- Plan and conduct a system safety program that provides for the identification and control of hazards to personnel, facilities, support equipment, and mission hardware and software during all stages of the contract procurement.
- Prepare and submit a System Safety Program Plan. This SSPP will describe the safety program requirements and implementation procedures that the contractor will invoke to ensure the identification and control of hazards to personnel and hardware.
- Perform Operation Hazard Analyses when the use of a facility or the performance of an activity could result in subjecting the instrument or personnel to hazards.
- Verify the control of all hazards by test, analysis, inspection, similarity to previously qualified hardware, or any combination of these activities.
- Follow all guidelines stated in the applicable contract and PAR.
- Follow WSMCR 127-1 (or most recent revision in the event of design changes) and MIL-STD 1574A (or most recent revision in the event of design changes) where applicable.

3.2 Contractual Implementation

All program procurements for flight hardware and AGE (aerospace ground equipment) shall include requirements for systems safety.

3.3 Safety Program Reviews

The POES Program Safety Manager and/or safety personnel shall participate in Design Status Reviews (SRR, PDR, CDR), and subsystem and instrument reviews such as Engineering Design Reviews and Technical Interchange Meetings as appropriate to oversee status of the POES System Safety Program, address safety concerns, and maintain cognizance of the POES design and program activities.

3.4 Change Assessment

Proposed changes to the design and operational procedures for the POES spacecraft and instruments shall be evaluated for their safety impact. POES safety personnel shall be aware of changes to the spacecraft/instrument design or procedures through participation in design and program reviews, and by direct contact with program engineers and other program personnel as appropriate.

4.0 Spacecraft Contractor Safety Program Milestones

Milestone	Submitted By	Date	CDRL
System Safety ProgramPlan (SSPP)	Contractor (NAS5-30350, GSFC S-480-26.1)	In accordance with contract	Item # 53 (e)
Preliminary Hazard Analysis (PHA)	Contractor (GSFC S-480-26.1)	Early Design Phase	NA
Operations Hazard Analysis (OHA)	Contractor (NAS5-30350, GSFC S-480-26.1)	30 days prior to an activity or use of a facility	Item # 60
Waivers	Contractor (NAS5-30350, GSFC S-480-26.1)	As Needed	NA
Orbital Debris Assessment (ODA)	NPD 8710.3 NSS 1740.14	By Preliminary Design Review and prior to Critical Design Review	NA
Safety Data Package (SDP, ARAR)	Contractor (NAS5-30350, GSFC S-480-26.1)	**First Submission** - 4/14/89 **Final** – 90 days before NOAA-K through N' Flight Assurance FRR	Item # 61
Launch Complex Safety Plan	Contractor (NAS5-30350, GSFC S-480-26.1)	60 days before shipment of NOAA-K through N' to launch site	Item # 62
Missile System Ground Safety Approval Package	Contractor (NAS5-30350, GSFC S-480-26.1)	120 days before shipment of NOAA-K through N' to launch site	Item #63

Mishap Report	Contractor (NAS5-30350, Attachment 2, Part C) NPD 8621.1G NPD 8621.1	As Required	Item #36

5.0 Safety Program Requirements

5.1 System Safety Program Plan

The spacecraft contractor shall prepare and submit a System Safety Program Plan to Goddard Space Flight Center (GSFC). The Plan shall describe the safety program requirements and implementation procedures that the spacecraft contractor will ensure the identification and control of hazards to personnel and hardware during fabrication, instrument integration, tests, transportation, ground activities, and launch.

The Plan will address the following areas: system safety organization, interfaces, and responsibilities; internal and external safety review process; launch site safety; hazardous operation surveillance; accident investigation and reporting; safety audits; and monitoring of subcontracts. The following data will also be provided: a milestone schedule of all major system safety activities that shows their time phasing with other related major activities; the procedure for reporting problems and activity status; and the industrial safety responsibilities, functions, and interfaces with the system safety program.

Section 5.1 also applies to the instrument contractor within the framework of the instrument PAR and other applicable contract documents.

5.2 Procedures

Each test, operating, or maintenance procedure, including computer-controlled test sequences, shall be reviewed by the spacecraft/instrument contractor system safety manager or his designated representative. The review shall be in accordance with the PAR and all other applicable contract documents.

5.3 Analyses

5.3.1 System Safety Checklist

Analyses shall be performed at component and system levels by the spacecraft contractor and shall be documented in accordance with MIL-STD-1574A, (or most recent revision in the event of any design change) to establish the applicable technical requirements of WSMCR 127-1 (or most recent revision in the event of any design change). The analyses shall be performed or updated for each review, and the completed forms shall become part of each safety data package.

5.3.2 Hazard Analysis

Early in the design phase and continuing through the contract effort, the spacecraft contractor shall develop analyses for identifying the hazards associated with the mission operations, hardware, support equipment, related software, and their interfaces. Spacecraft ground operations and ground support equipment shall also be analyzed. All hazards that affect personnel, launch vehicle hardware, or the spacecraft shall be identified. The analyses shall be updated as the hardware progresses through the stages of design, fabrication, test, transportation,

and launch activities. The hazard reports shall be submitted as part of the safety data package, prior to each design review, to document the identification, causes, controls, and verification methods for each hazard.

Section 5.3.2 also applies to the instrument contractor within the framework of the instrument PAR and other applicable contract documents.

5.3.3 Operations Hazard Analyses

When the use of a facility or the performance of an activity could result in subjecting the payload or personnel to hazards, the spacecraft contractor shall perform an Operations Hazard Analysis (OHA) to identify the hazards and to document the requirements for either eliminating or adequately controlling each hazard. Operations that may require analyses include handling, transportation, functional tests, and environmental tests. A report of each OHA performed shall be submitted in accordance with Attachment 2 of the spacecraft contract.

Section 5.3.3 also applies to the instrument contractor within the framework of the instrument PAR and other applicable contract documents.

5.4 Hazard Control Verification

The control of all hazards shall be verified by test, analysis, inspection, similarity to previously qualified hardware, or any combination of these activities. Section 5.4 applies to the spacecraft contractor and the instrument contractor within the framework of the spacecraft and instrument PAR and other applicable documents.

5.5 Waivers

All identified and unresolved safety issues that do not comply with NASA or Western Range requirements shall be addressed through preparation of a waiver non-compliance request in concurrence with WSMCR 127-1 (or most recent revision in the event of any design change). All deviation/waiver non-compliance requests must be submitted to the POES Program Safety Manager who will forward it to the Western Range for approval.

5.6 Orbital Debris Assessment

An Orbital Debris Assessment (ODA) is required for the POES spacecraft under NPD 8710.3. An Orbital Debris Assessment for NOAA-M was generated “in house” in 2001 to address this requirement. It shall be required that an ODA be generated for NOAA-N and N’ as well due to significant design changes to these spacecraft. NSS 1740.14 provides guidelines and procedures for limiting orbital debris.

5.7 Safety Data Package (SDP, ARAR)

The spacecraft contractor shall submit a safety data package that applies to the existent phase of the program at the time of the SCR, PDR, CDR, and FRR. The contents of each package shall

show status of compliance with the requirements of WSMCR 127-1 (or most recent revision in the event of any design change) and shall be submitted in accordance with Attachment 2 of the contract. Each package should include an adequate technical and functional description of the spacecraft systems. The system safety checklist, completed analyses results, and hazard reports shall also be included.

5.8 Launch Complex Safety Plan

The spacecraft contractor shall submit the appropriate data for inclusion in the Launch Complex Safety Plan in accordance with WSMCR 127-1, Chapter 5 (or most recent revision in the event of any design change). The data will be submitted in accordance with Attachment 2 of the contract.

5.9 Missile System Ground Safety Approval Package

The spacecraft contractor shall submit a Missile System Ground Safety Approval Package in accordance with WSMCR 127-1 (or most recent revision in the event of any design change). The package shall be submitted in accordance with Attachment 2 of the contract.

5.10 Mishap Report

The spacecraft contractor shall submit a mishap report in the event that one is required. All NASA mishaps and close calls must be reported immediately to a supervisor, safety or health official, or program manager who will notify the Center safety office. The NASA Mishap Reporting and Investigating Policy (NPD 8621.1G), and the NASA Procedures and Guidelines for Mishap Reporting, Investigating, and Recordkeeping (NPD 8621.1) provide guidance for the reporting of mishaps and close calls.

5.11 System Safety Criteria

All contractor designs shall be capable of complying with the safety requirements defined in the applicable range requirements. System safety analyses provide a means to systematically and objectively identify hazards, determine their risk level, and suggest the mechanism for their elimination or control. This process begins in the conceptual phase and extends throughout the life cycle of the spacecraft, including disposal.

Effective accident control involves many aspects of system engineering, including considerations of severity and cost versus impact potential, basic design options, reaction time, and procedural controls. The contractor's accident risk assessment efforts and related hazards analyses shall reflect relative severity and probability of occurrence. These categories shall be used for tracking risk reduction. Direction for assigning hazard severity and probability is outlined in MIL-STD-1574A, Ch. 5 (or most recent revision in the event of any design change).

5.12 System Safety Precedence

Risk management is a decision-making process consisting of evaluation and control of the severity and probability of a potentially hazardous event. Hazard resolution strategies are listed below in descending order of precedence, as outlined in MIL-STD-1574A, Section 5, (or most recent revision in the event of any design change).

- **Design to Eliminate Hazards** – The hazard source or the hazardous operation is eliminated by design without degrading the performance of the system.
- **Design to Control Hazards** – In cases where hazards are inherent and cannot be eliminated completely, they will be controlled through design if possible. The major safety goal during the design process is to include safety features that are fail-safe or have capabilities to handle contingencies through redundancy of critical elements. System safety analysis should identify hazard control, damage control, containment, and isolation procedures.
- **Incorporate Safety Devices** – Hazards which cannot be eliminated through design will be controlled through the use of appropriate safety features or devices if possible.
- **Provide Warning Devices** – Where it is not possible to prevent the existence or occurrence of an identified hazard, visual or audible warning devices should be employed for the timely detection of conditions that precede the actual occurrence of the hazard. Warning signals and their application should be designed to minimize the probability of incorrect personnel reaction to the signals, or to false alarms that could lead to a secondary hazard.
- **Provide Administrative Procedures and Training** – Where a hazard cannot be eliminated or controlled using one of the before mentioned methods, special malfunction or emergency procedures should be developed and implemented at the contractor's site.

5.13 Hazard Closure Criteria

Closure of a hazard requires the signed approval of the POES Program Manager and the respective range authorities to indicate concurrence with the hazard closure. The signature approval will signify that appropriate measures to reduce the risk to an acceptable level have been employed or that management accepts the risk.

Reduction of risk to an acceptable level requires verification that the necessary safety design and hazard control requirements have been implemented. Verification methods shall include system safety review of specifications, drawings, and procedures; review of flight qualification and manufacturing acceptance test results; and inspections. Verification of implementation and effectiveness shall be completed and documented on the applicable hazard report, (MIL-STD-1574A, Section 5.2.14.1), before any item will be considered closed (MIL-STD-1574A, Section 5.2.12, (or most recent revision in the event of any design change). The closeout action on the applicable hazard report will provide traceability, and verification for all closed hazards.

APPENDIX A

GLOSSARY OF TERMS

APPENDIX A - GLOSSARY OF TERMS

ADACS	**Attitude Determination and Control Subsystem**
AGE	**Aerospace Ground Equipment**
AKM	**Apogee Kick Motor**
AMSU-A	**Advanced Microwave Sounding Unit – Module A**
AMSU-B	**Advanced Microwave Sounding Unit – Module B**
ARAR	**Accident Risk Assessment Report**
AVHRR/3	**Advanced Very High Resolution Radiometer-Mod3**
CDR	**Critical Design Review**
CDRL	**Contract Data Requirements List**
C&DH	**Command & Data Handling**
29 CFR 1910	**Code of Federal Regulations, General Industry**
DCS/2	**Data Collection System**
DPM	**Deputy Project Manager**
DPMR	**Deputy Project Manager/Resources**
DTR	**Digital Tape Recorder**
EGSE	**Electrical Ground Support Equipment**
ESM	**Equipment Support Module**
FM	**Finance Manager**
FRR	**Flight Readiness Review**
GSFC	**Goddard Space Flight Center**
HIRS/3	**High Resolution Infrared Radiation Sounder-Mod3**
IMP	**Instrument Mounting Platform**
IMU	**Inertial Measuring Unit**
MHS	**Microwave Humidity Sounder**
MIL-STD-1574A	**Military Standard 1574A**
MSU	**Microwave Sounding Unit**
NASA	**National Aeronautics and Space Administration**
NOAA	**National Oceanographic and Atmospheric Administration**
NPD	**NASA Policy Directive**
NSS	**NASA Safety Standard**
NULS	**Nitrogen Unloading System**

OHA	**Operations Hazard Analyses**
OSHA	**Occupational Safety and Health Administration**
PAE	**Product Assurance Engineer**
PAR	**Performance Assurance Requirements**
PDR	**Preliminary Design Review**
POES	**Polar Operational Environmental Satellites**
PS	**Program Scientist**
RA	**Resource Analyst**
RSS	**Reaction Control Support Structure**
SA	**Solar Array Assembly**
SAM	**Systems Assurance Manager**
SAR	**Search and Rescue**
SARP	**Search and Rescue Processor**
SARR	**Search and Rescue Repeater**
SBUV/2	**Solar Backscatter Ultraviolet Sounding Spectral Radiometer/2 Instrument**
SDP	**Safety Data Package**
SEM/2	**Space Environment Monitor**
SLV	**Space Launch Vehicle**
SRR	**Search and Rescue Repeater**
SSA	**Sun Sensor Assembly**
SSPP	**System Safety Program Plan**
SSR	**Solid State Recorder**
SW MGR	**Software Manager**
WSMCR 127-1	**Western Space and Missile Center Requirements 127-1**
VAFB	**Vandenberg Air Force Base**
VTL	**Verification Tracking Log**